

CLAIMS

What is claimed is:

- 1 1. A method for preserving frame order across an aggregated link comprising:
- 2 (a) receiving up to a plurality of indications denoting commencement of frame
- 3 transmission on each of a plurality of virtual links each associated with a particular quality of
- 4 service level comprising the aggregated link; and
- 5 (b) assigning a plurality of pointer values to a corresponding plurality of records in an
- 6 appropriate ones of a plurality of pointer value buffers associated with the corresponding
- 7 plurality of virtual links based, at least in part, on the relative order in which data frames are
- 8 transmitted on each of the links.
- 1 2. The method of claim 1, further comprising:
- 2 (c) receiving the transmitted data frames from each of the plurality of virtual links in
- 3 a common receive buffer;
- 1 3. The method of claim 2, further comprising:
- 2 (d) reading the received frames from the common receive buffer based, at least in
- 3 part, on the pointer value assigned in each of the pointer value buffers.
- 1 4. The method of claim 3, wherein frames are promoted from the receive buffer with
- 2 priority given to pointer value order in pointer value buffers associated with the virtual links
- 3 having higher quality of service levels.

1 5. The method of claim 1, wherein a plurality of pointer value buffers are used to store
2 pointer values denoting the commencement of transmission of frames on a corresponding
3 plurality of virtual links supporting a discrete quality of service levels.

1 6. The method of claim 1, wherein received frames are promoted in pointer value order with
2 priority given to pointer value buffers associated with the virtual links with higher quality of
3 service characteristics.

1 7. The method of claim 1, wherein the indication is an analog indication.

1 8. The method of claim 7, wherein the data network is an Ethernet network and the
2 indication is a receive data valid (RX_DV) signal.

1 9. The method of claim 1, wherein the order of pointer values in each of the pointer value
2 buffers do not correspond to the order of frame transmission.

1 10. An apparatus comprising:
2 a receive buffer having a plurality of records in which to store frames of data received
3 from a plurality of virtual links, each associated with a particular quality of service level;
4 a plurality of pointer value buffers each associated with one of the virtual links; and
5 a network interface, coupled to the receive buffer and the pointer value buffers, to assign
6 a plurality of pointer values in appropriate ones of the plurality of pointer value buffers in
7 response to the commencement of transmission of frames on the associated virtual link.

1 11. The apparatus of claim 10, wherein frames transmitted over each of the virtual links are
2 stored in the common receive buffer until retired by the apparatus.

1 12. The apparatus of claim 10, wherein the indication is an analog indication.

1 13. The apparatus of claim 12, wherein the indication is an asserted receive data valid signal.

1 14. The apparatus of claim 10, wherein the network interface retires the received frames from
2 the receive buffer to a system state in order of pointer value in each of the plurality of pointer
3 value buffers.

1 15. The apparatus of claim 14, wherein the frames are retired in pointer value order for each
2 of the plurality of pointer value buffers, with priority given to pointer value buffers associated
3 with higher quality of service virtual links.

1 16. In a data network, a method for preserving frame order of a plurality of frames
2 transmitted across a plurality of virtual links of a multi-link trunk, wherein each of the virtual
3 links is associated with a discrete quality of service, the method comprising:

4 (a) receiving up to a plurality of indications denoting commencement of frame
5 transmission on each of the virtual links of the multi-link trunk; and

6 (b) assigning a plurality of pointer values to a plurality of records corresponding to a
7 number of indications received from each of the virtual links in appropriate ones of a plurality of
8 pointer value buffers associated with the plurality of virtual links based, at least in part, on a
9 relative order in which the indications are received.

1 17. The method of claim 16, further comprising promoting the received frames from a
2 common receive buffer in pointer value order of the pointer value buffers, with priority given to
3 the pointer value buffers associated with the virtual links having higher quality of service
4 characteristics.

1 18. The method of claim 16, wherein the indications are an analog signal denoting receive
2 data valid.

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03-03-2009
19. A storage medium comprising a plurality of executable instructions which, when
2 executed by a processor, cause the processor to implement a plurality of functions including a
3 function to preserve frame order of frames transmitted over a plurality of virtual links each
4 associated with a discrete quality of service, the function implementing pointer value buffers
5 associated with each of the virtual links and, upon receiving an indication from the virtual link,
6 stores pointer values in appropriate ones of the pointer value buffers denoting commencement of
7 frame transmission on the virtual link.

1 20. The storage medium of claim 19, wherein the executable instructions further include
2 instructions to promote data frames received in a common buffer from the plurality of virtual
3 links in pointer value order as stored in the pointer value buffers, with priority given to pointer
4 values stored in pointer value buffers associated with high quality of service characteristics.